SECOND INTERNATIONAL WORKSHOP ON *HELICOBACTER PYLORI* INFECTIONS IN THE DEVELOPING WORLD

Introduction

The Second International Workshop on *Helicobacter pylori* Infections in the Developing World was held at the Universidad Peruana Cayetano Heredia in Lima, Peru, on 28–31 January 1996; participants from eight countries attended the workshop. The First International Workshop on *Helicobacter pylori* Infections in the Developing World took place at the International Center for Diarrhoeal Diseases Research, Bangladesh (ICDDR, B), in Dhaka, Bangladesh, on 2–4 February 1993 [1, 2]. The workshop was an attempt to again bring together those persons directly working in this field to discuss the latest research on epidemiology, microbiology, diagnosis, and treatment of *H. pylori* infection as it applies to developing countries.

It is now clear that infection with *H. pylori* is extremely common worldwide, particularly in developing countries (where it occurs in most children and adults living in poor socioeconomic conditions). It is also now clear that the pathological lesions of gastritis in infected persons living in the developing world are more severe than those in infected persons living in the developed world. For these two reasons, we thought it was important to focus on this aspect of *H. pylori* infections.

Children in developing countries, such as Peru, Bangladesh, and The Gambia, become infected at a very early age (often within the first few months of life) and probably remain infected throughout life. The pathology in infected adults living in these countries, however, may be markedly different. In Peru, gastric cancer is very common and peptic ulcer is infrequent, whereas in Bangladesh, peptic ulcer is common and gastric cancer is infrequent. It is not presently known whether these differences are due to the host or to the bacterium. Differences in diet, including micronutrients such as selenium, have been postulated to account for these differences.

Infection is much more common in areas of poor sanitation. Whereas rates of reinfection are very high (up to 50% per year) in developing countries, they are low (1% per year) in developed countries. Contaminated water seems to be the most likely vehicle of transmission. Travelers from the developed world who visit the developing world have been found to acquire the infection, as would be expected if this form of transmission occurs.

Means for diagnosis of *H. pylori* infection in the developing world are not readily available. Endoscopy, biopsies, and cultures are useful clinically, but these techniques are not applicable for large population studies. New developments in instrumentation may make use of the C^{13} urea breath test more readily available. Serology, which has been used widely for diagnosis, requires reagents that are not always available and affordable. There is still the need for simpler noninvasive diagnostic assays, such as identification of the organisms in stool.

The genetic characterization of strains of *H. pylori* from developing countries is now under way; this characterization may lead to a better definition of virulence factors and should make it possible to distinguish relapse from reinfection in persons who have been successfully treated for their infection but reacquire it several months later.

The pathophysiology of *H. pylori* infections has been extensively studied in patients with all grades of gastritis, from chronic superficial gastritis to chronic deep gastritis to chronic atrophic gastritis (which is accompanied by decreased gastric acid and is associated with intestinal metaplasia and dysplasia and the development of gastric cancer). This progression of pathology has been thoroughly described by Peruvian scientists. The high rate of chronic atrophic gastritis in Peru (about 34% of adult patients are infected) does not seem to occur in Bangladesh. Furthermore, Peruvians living at high altitudes were found to have more severe gastric atrophy than Peruvians living in coastal areas who had similar low socioeconomic status. Further epidemiological studies are needed to determine what other cofactors may be important in the development of these lesions.

H. pylori is associated with peptic ulcer in developed countries; therefore, one would expect an even higher rate of ulcer disease in the developing world. Available reports, however, show relatively low rates of peptic ulcer in rural Africa and Peru.

Growth inhibition in young children who are infected with *H. pylori* has been found in several developing countries. Furthermore, an increased rate of persistent diarrhea in Bangladeshi children has been found.

Many treatment schemes have been described that clearly indicate that triple-drug therapy is distinctly superior to regimens with only two drugs. In some developing countries, however, drug resistance has become a problem, particularly resistance to metronidazole as found in Peru. Although treatment is

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effective in eradicating the organisms, reinfection is the major concern in developing countries. Whereas rates of reinfection in the United States (1%), Chile (3%), and Spain (3%) are low, rates of reinfection in Peru within 1 year of treatment have been reported to be nearly 90%. It may be possible through immunization with *H. pylori* vaccines that are presently being developed to prevent reinfection.

The following series of articles represents about two-thirds of the reports presented during the workshop.

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